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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/824,456	04/02/2001	Masaaki Yuri	NAK1-BO34	9508

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EXAMINER
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MENEFEE, JAMES A

ART UNIT	PAPER NUMBER
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2828

DATE MAILED: 11/01/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

09/824,456

**Applicant(s)**

YURI ET AL.

**Examiner**

James A. Menefee

**Art Unit**

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 09 August 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-19,29 and 31-40 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8,11-19,29,31-36 and 38-40 is/are rejected.
- 7) ☒ Claim(s) 9,10 and 37 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 7/12/2004 has been entered. Accordingly, claims 1, 29, 31-32, and 35-40 are amended. Claims 1-19, 29, and 31-40 are pending.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-8, 11-12, 15, 29, 31, 32, 36, and 38-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stephens (US 5,386,426) in view of Miki et al. (US 6,094,515).

#### **Independent claims:**

Regarding claim 1, Stephens discloses in Fig. 6 a semiconductor laser device comprising a plurality of laser light oscillators 38 that each emit light from an outlet thereof, and a diffraction grating 50' that transmits a laser beam that is oscillated in at least one of the laser light oscillators and is emitted from an outlet thereof so that a portion of the laser beam is

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incident on at least one of the other laser light oscillators. See discussion of Fig. 6, and also col. 3 lines 63-67 (disclosing that the outputs may be directed back to other lasers in the array).

Regarding claims 29 and 39-40, the limitations are disclosed as in the rejection of claim 1 above, and further phase locking of the oscillators is enabled. It is not explicitly disclosed that phase locking is enabled. However, the phase locking, as defined by the applicant in various places throughout the specification, occurs due to the beam of each of the lasers of the array being reflected back to be incident on another of the lasers of the array. This reflection back of a beam to another of the lasers of the array is disclosed by Stephens as shown above, and thus it is deemed inherent that due to the Stephens disclosing the exact same configuration, phase locking is enabled in Stephens.

Regarding these independent claims, there is not disclosed one or more condenser lenses that receive the beam from the output of the diffraction grating and the diffraction grating is positioned between the laser oscillators and the condenser lens. Miki teaches that a semiconductor laser beam is often coupled into a fiber, and that when a laser beam is coupled into a fiber, a condenser lens 26 may be used to improve coupling efficiency. See Fig. 3, and also col. 1 lines 41-48. It would have been obvious to one skilled in the art to include a condenser lens at the output of the grating so that the output light may be converged into a fiber with improved efficiency, as taught by Miki.

Dependent claims:

Regarding claim 2, Stephens discloses the plurality of lasers are included in a semiconductor laser array element, and the diffraction grating is disposed so as to face the outlet

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of the at least one of the oscillators, the diffraction grating being translucent to partially transmit and partially reflect so that the laser beam is directed to the at least one of the other oscillators.

Regarding claims 3 and 38, it is not disclosed that the plurality of light oscillators are located in a plurality of array elements (rather than the single array element as shown). It would have been obvious to one skilled in the art to form this array in a number of elements as claimed, since it has been held that constructing a formerly integral structure in various elements involves only routine skill in the art. *Nerwin v. Erlichman*, 168 USPQ 177, 179. A plurality of stacked arrays would be the equivalent of a single larger array.

Regarding claims 4 and 36, Stephens discloses a reflecting optical path of the grating is directed to the outlet of the at least one other light oscillator, thereby the portion of the laser beam is directed in a vicinity of an optical axis of the laser beam at the outlet of the at least one other light oscillator.

Regarding claims 5-8 and 31, the diffraction grating is shown as a flat plate having a scabrous plane or diffraction grating located on a main surface thereof, the main surface being an incidence plane of the light, the plate partially reflecting/diffracting necessarily at a predetermined angle due to the ridges of the grating.

Regarding claims 11-12 and 32, the grating is disclosed as holographic by Stephens. See col. 10 lines 15-16.

Regarding claim 15, the array elements may be included on a single substrate.

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Claims 1-4, 15, 29, 35-36, and 38-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pillai (US 6,212,216) in view of Allen (US 4,006,487). Pillai discloses the claimed invention as follows (see in particular Figs. 21A and 23 and the discussion thereof):

Independent claims:

Regarding claim 1, Pillai discloses a semiconductor laser device comprising a plurality of laser light oscillators 1-5 that each emit light from an outlet thereof, and a diffraction grating 181,186 that transmits a laser beam that is oscillated in at least one of the laser light oscillators and is emitted from an outlet thereof so that a portion of the laser beam is incident on at least one of the other laser light oscillators. See also col. 10 lines 25-30.

Regarding claims 29 and 39-40, the limitations are disclosed as in the rejection of claim 1 above, and further phase locking of the oscillators is enabled. See col. 10 lines 25-30.

Regarding these independent claims, there is not disclosed one or more condenser lenses that receive the beam from the output of the diffraction grating and the diffraction gratings is positioned between the laser oscillators and the condenser lens. Pillai teaches the grating in an output fiber. Allen teaches that an output from a fiber is divergent, and a condenser lens may be used to converge the light that is output from the fiber. See col. 8 lines 47-55. It would have been obvious to one skilled in the art to include a condenser lens at this position (which will then make the grating be located between the lasers and the condenser lens) so that the divergent light that is output from the fiber may be collected and converged for use with a particular application, as taught by Allen.

Dependent claims:

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Regarding claim 2, the plurality of lasers 1-5 are included in a semiconductor laser array element, and the diffraction grating is disposed so as to face the outlet of the at least one of the oscillators, the diffraction grating being translucent to partially transmit and partially reflect so that the laser beam is directed to the at least one of the other oscillators.

Regarding claims 3 and 38, Pillai discloses the plurality of light oscillators may be located in a plurality of array elements that are stacked up. See Fig. 21, which shows two stacked arrays each having a plurality of light oscillators. The remaining limitations are disclosed as in the rejection of claim 2 above.

Regarding claims 4 and 36, Pillai discloses a reflecting optical path of the grating is directed to the outlet of the at least one other light oscillator, thereby the portion of the laser beam is directed in a vicinity of an optical axis of the laser beam at the outlet of the at least one other light oscillator.

Regarding claim 15, the array elements may be included on a single substrate.

Regarding claim 35, Pillai discloses the grating may reflect back a few percent to 99% of the incident light. The claim requires 10% to 30% to be reflected back. In the case where the claimed ranges “overlap or lie inside ranges disclosed by the prior art” a prima facie case of obviousness exists. *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990).

Claims 11-12 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pillai and Allen as applied to the claims above, and further in view of Rakuljic et al. (US 5,691,989). Pillai and Allen teach the claimed limitations as shown above, but do not teach the

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grating is a hologram. Rakuljic teaches that a hologram grating may be substituted for a grating. It would have been obvious to one skilled in the art to use a hologram grating as it is accurate and temperature stable, as taught by Rakuljic.

Claims 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pillai and Allen as applied to the claims above, and further in view of Ota (previously cited US 5,570,226). Pillai discloses and teaches the limitations of the claims shown above, but does not disclose that the oscillators have two outlets. Ota teaches a similar system where the back side of the array is also an outlet. It would have been obvious to one skilled in the art to include the back side as an outlet so that the laser beam may be monitored, as taught by Ota.

Claims 16-17 and 33-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pillai and Allen as applied to the claims above, and further in view of Thornton et al. (US 5,766,981). Pillai and Allen teach the claimed limitations as shown above, but do not teach the following:

Regarding claims 16-17 and 33, the lasers are parallel and may be in a single array. It is not disclosed that the lasers may be real refractive index guided. Thornton teaches a laser array (in Fig. 3) that is index guided. See col. 1 lines 20-40. It would have been obvious to one skilled in the art to make the lasers of the array index guided in order to lower astigmatism, as taught by Thornton.

Regarding claim 34, the particular active layers of GaInP/AlGaInP quantum wells are not disclosed. However, such active layers are known in the art. See Thornton, col. 7, table (listing



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GaInP as active, and AlGaInP as confinement). It would have been obvious to one having ordinary skill in the art at the time the invention was made to use these particular materials for the active layers, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 227 F.2d 197, 125 USPQ 416 (CCPA 1960).

Claims 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pillai and Allen as applied to the claims above, and further in view of Craig et al. (previously cited US 6,167,075). The claims are describing a plurality of the devices of claim 1 having the outputs of each device condensed, and various other means. Craig teaches a number of laser array elements whose outputs are condensed as claimed (figs. 1, 6). It would have been obvious to one skilled in the art to utilize a number of arrays in this manner to provide a high power output, as taught by Craig.

#### ***Allowable Subject Matter***

Claims 9-10, and 37 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The following is a statement of reasons for the indication of allowable subject matter:

There is not taught or disclosed in the prior art a plurality of laser oscillators that each emit a beam to a diffraction grating that transmits the beam and a portion is incident on another

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of the oscillators, and the condenser lens as claimed, where the grating is one of the gratings specified in the above claims.

For example, it is not taught or disclosed in the art that the grating should direct +1<sup>st</sup> order and -1<sup>st</sup> order light so that the light will be reflected back to an adjacent oscillator to the one which emitted the light. Nor is it taught or disclosed that the grating in a system such as that claimed may have grooves that cross each other.

### ***Response to Arguments***

Applicant's arguments filed 7/12/2004 have been fully considered but are not wholly persuasive.

Applicant argues that the 35 U.S.C. § 112 rejection is now moot in light of the amendment. Remarks p. 11. This argument is persuasive and the § 112 rejection is withdrawn.

Applicant next describes the purpose of the Pillai reference. Applicant states that Pillai "is not trying to achieve a relatively high powered laser beam," Remarks, p. 12, but it is noted that there is nothing in the claims concerning a "high powered laser beam." Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. *See In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Applicant argues that "The laser light in [Pillai] is not optimal for phase locking." Remarks p. 12. Yet, Pillai explicitly states that the configuration "makes it easier for all of the emitters to lock in phase." Pillai, col. 10 lines 29-30. Given this statement, it is not understood how Pillai does not "enable a phase locking" as required by the claims.

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Applicant notes that the beam of Pillai “is certainly not for the purposes of cutting or burning a hole,” Remarks p. 13, but again the invention *as claimed* is not concerned with high power, and there is nothing claimed about cutting or burning holes. Again, limitations from the specification are not read into the claims.

Applicant argues that the grating of Pillai does not meet the claimed range of reflectivity of 10-30%. Remarks, p. 13-14. Pillai discloses the grating can have reflectivities from a few to 99%. Pillai, col. 10 lines 63-65. But applicant relies on the specific example of Pillai, which discloses the grating to have a 4% reflectivity, as the only teaching of Pillai and thus presumes that Pillai does not teach a reflectivity between 10-30%. Disclosed examples and preferred embodiments do not constitute a teaching away from a broader disclosure or nonpreferred embodiments. *In re Susi*, 440 F.2d 442, 169 USPQ 423 (CCPA 1971). “The use of patents as references is not limited to what the patentees describe as their own inventions or to the problems with which they are concerned. They are part of the literature of the art, relevant for all they contain.” *In re Heck*, 699 F.2d 1331, 1332-33, 216 USPQ 1038, 1039 (Fed. Cir. 1983) (quoting *In re Lemelson*, 397 F.2d 1006, 1009, 158 USPQ 275, 277 (CCPA 1968)). Applicant cannot merely ignore the broader teaching of Pillai because there is also disclosed a preferred embodiment. Pillai teaches a reflectivity of a few to 99%, this yielding the overlap of ranges rejection noted above. A prima facie case has been made, and it is now up to the applicant to rebut this case.


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***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James A. Menefee whose telephone number is (571) 272-1944. The examiner can normally be reached on M-F 8:30-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, MinSun Harvey can be reached on (571) 272-1835. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
James Menefee  
October 26, 2004  
JM